



MEMORANDUM

ENGINEERING SERVICES

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To: Newberg Traffic Safety Commission
Cc: Brian Casey, PD Chief
From: Brett Musick, PE, Senior Engineer
RE: Guidelines on Marked vs. Unmarked Crosswalks - Presentation

SUMMARY

At signalized intersections, all pedestrian crosswalks should be marked.

At stop-controlled intersections, standards vary from one municipality to another. Generally, they should only be used in areas where safety or pedestrian demand require them based on an engineering study. Overuse of marked crosswalks could desensitize motorists to their presence.

At uncontrolled intersections and mid-block crossings, marked crosswalks are discouraged. Studies have shown that on their own they do not reduce pedestrian-involved crash rates, and in some circumstances increase it. There are some circumstances in which marked crosswalks are warranted, but they should be accompanied with additional features like amber warning lights and median islands.

For all cases engineering judgement is required for making a decision on installing a marked crosswalk.

SIGNALIZED INTERSECTIONS

The MUTCD recommends that signalized intersections should have marked crosswalks where engineering judgment deems them necessary (MUTCD 3B-18.07).

ODOT requires marked crosswalks at all signalized approaches of an intersection, except where pedestrian crossing is prohibited (ODOT 2018 Traffic Manual 6.6.2.2).

STOP-CONTROLLED INTERSECTIONS

At stop-controlled intersections, ODOT and the MUTCD leave the decision of whether or not to install marked crosswalks up to engineering judgement (MUTCD 3B-18.07, ODOT 2018 Traffic Manual 6.6.2.1, ODOT Traffic Line Manual Section 430.03).

Because specific guidelines are not offered, various states and municipalities differ in how they implement them. Below are examples from a peer review of some agencies:

Portland, OR: Crosswalks should be marked when they:

- help orient pedestrians in finding their way across a complex intersection, or
- help show pedestrians the shortest route across traffic with the least exposure to vehicular traffic and traffic conflicts, or
- help position pedestrians where they can best be seen by oncoming traffic.

San Francisco, CA: Intersection approaches controlled by STOP signs can be recommended for marked crosswalks if any of the following conditions apply:

- The crosswalk is located in a school area.
- Elderly or disabled pedestrian volumes of 20 or more are expected during the peak hour of pedestrian demand.
- Pedestrian volumes of 60 or more are expected during the peak hour of pedestrian demand and vehicular daily volumes of 6,000 or more are expected to cross over the crosswalk.
- Safety or efficiency reasons dictate directing pedestrians to a particular leg of the intersection.
- STOP sign approaches are on a Minor Arterial or Major Arterial.

Virginia DOT: The following criteria should be considered:

- Effectiveness. Should only be placed in areas of high pedestrian activity to avoid desensitizing motorists to the presence of crosswalks.
- Alternative treatments such as warning signs, curb extensions, refuge islands or other measures that can be used in conjunction with marked crosswalks.
- Adequate sight distance of pedestrians. Consider parking prohibitions near sidewalks to prevent parked cars from blocking a driver's view of pedestrians.
- Alternative crossing locations.

UNCONTROLLED INTERSECTIONS AND MID-BLOCK CROSSINGS

The MUTCD cautions against marked crosswalks at uncontrolled locations, stating that prior to installation an engineering study should be conducted that considers “the number of lanes, the presence of a median, the distance from adjacent signalized intersections, the pedestrian volumes and delays, the average daily traffic (ADT), the posted or statutory speed limit or 85th-percentile speed, the geometry of the location, the possible consolidation of multiple crossing points, the availability of street lighting, and other appropriate factors” (MUTCD 3B-18.08).

A study from the University of North Carolina found that marked crosswalks at uncontrolled locations did not decrease pedestrian-involved crash rates unless they were accompanied by other features like medians and amber warning lights. On some types of roads, marked crosswalks increased the risk of pedestrian-involved crashes. The FHWA recommends the use of Table 1 (see next page) when deciding whether or not to install marked crosswalks.

Table 1: FHWA Recommendations for Marked Crosswalks

Roadway Type	ADT < 9,000			9,000 < ADT < 12,000		
	Speed Limit					
	≤ 30 mph	35 mph	40 mph	≤ 30 mph	35 mph	40 mph
2 lanes	C	C	P	C	C	P
3 lanes	C	C	P	C	P	P
4 or more lanes, with raised median	C	C	P	C	P	N
4 or more lanes, no raised median	C	P	N	P	P	N
	12,000 < ADT < 15,000			ADT > 15,000		
	Speed Limit					
	≤ 30 mph	35 mph	40 mph	≤ 30 mph	35 mph	40 mph
2 lanes	C	C	N	C	P	N
3 lanes	P	P	N	P	N	N
4 or more lanes, with raised median	P	P	N	N	N	N
4 or more lanes, no raised median	N	N	N	N	N	N

C = Candidate sites for marked crosswalks. Before installing new marked crosswalks, an engineering study is needed to determine whether the location is suitable for a marked crosswalk. It is recommended that a minimum utilization of 20 pedestrian crossings per peak hour (or 15 or more elderly and/or child pedestrians) be confirmed at a location before placing a high priority on the installation of a marked crosswalk alone.

P = Possible increase in pedestrian crash risk may occur if crosswalks are added without other pedestrian facility enhancements. These locations should be closely monitored and enhanced with other pedestrian crossing improvements, if necessary, before adding a marked crosswalk.

N = Marked crosswalks alone are insufficient. Consider using other treatments, such as traffic-calming treatments, traffic signals with pedestrian signals where warranted.

At multilane uncontrolled intersections, ODOT requires wide advance stop bars 20 to 50 ft (typically 30 ft) from the nearside crosswalk edge. At single lane uncontrolled intersections, these stop bars are optional (ODOT Traffic Line Manual Section 430.10-11).

As with stop controlled intersections, various states and municipalities differ in criteria used to establish marked crosswalks at uncontrolled intersections. Below are examples from a peer review of some agencies:

Virginia DOT: Marked crosswalks at uncontrolled locations are discouraged unless:

- The location is already a source of a substantial number of mid-block crossings or it is anticipated to generate mid-block crossings (for a new development).
- The land use is such that a pedestrian is highly unlikely to cross the street at an adjacent intersection, and when mid-block crossings would be frequent.
- The safety and capacity of adjacent intersections create a situation where it is dangerous to cross the street except at a designated mid-block location.
- Spacing between adjacent signals exceeds 600 ft.

San Francisco, CA: Marked crosswalks at uncontrolled locations should only be installed if ALL of the following criteria are met:

- The nearest controlled crossing is > 300 ft away.
- Stopping sight distance is adequate.
- Street lighting is adjacent to the crosswalk.
- Other safety considerations do not preclude marking a crosswalk.
- There is sufficient demand (one or more of the following criteria are met).
 - o Located in a school zone.
 - o 15 or more pedestrians crossing per hour for multiple hours each day.
 - o 20 or more pedestrians crossing during peak hour, with fewer than 5 gaps in traffic per 5 minute period.

The peer review examples for stop controlled and uncontrolled intersections are from jurisdictions with much larger populations than the City of Newberg. Research did not identify nearby communities with populations similar to Newberg's that had developed marked crosswalk policies. Most local, non-metropolitan type, jurisdictions rely on federal and state guidelines for making decisions on installing marked crosswalks.

SOURCES

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